

FBXTM1802

DUAL FEEDBACK EXTERMINATOR

OPERATING GUIDE

CONGRATULATIONS! You now have the state-of-the-art in feedback control.

WHAT IS THE FBX FEEDBACK EXTERMINATOR?

The Sabine **FBX-1802** automatic feedback controller is a dual-channel 18-bit digital audio and 32-bit floating point filtering device. Controlled by a digital signal processor (DSP), the **FBX** automatically finds and eliminates feedback in sound systems. It does it quicker and with less tonal degradation than any other method.

WHAT DOES IT DO?

The **FBX-1802** quickly senses feedback in a sound system and determines its pitch. It then assigns one of its very narrow digital notch filters to the resonating frequency and eliminates the feedback in less than a second. In almost every case, the **FBX** automatically controls feedback faster, and with less sound field distortion, than the best graphic or parametric equalizer.

HOW DOES IT WORK?

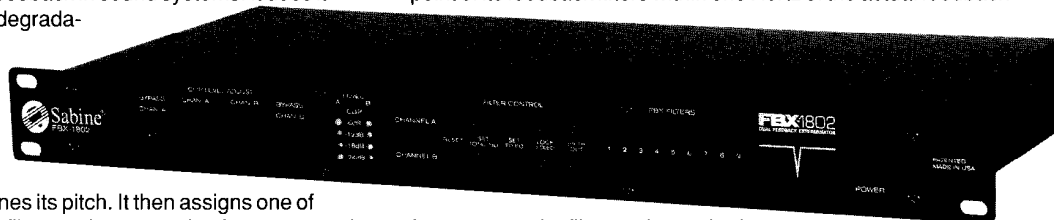
The **FBX** utilizes nine narrow band, independent, digital notch filters per channel - any of which may be "Fixed" or "Dynamic." The user selects the number of Fixed versus Dynamic filters. The Fixed filters enable increased gain before feedback. The **FBX** sets the Fixed filters to control the strongest feedback frequencies. The Fixed filters remain set on the strongest resonating frequencies until the user resets the **FBX**. The Dynamic filters control intermittent feedback that may develop or change during a program. They are automatically reassigned new frequencies as feedback occurs. Total feedback control is now achieved with less program degradation than with any other method.

PROBLEMS WITH GRAPHIC EQUALIZERS:

Until the introduction of the **FBX**, parametric and graphic equalizers were the only practical devices available for controlling feedback in live performances. The disadvantage is that manual operation of both parametric and graphic EQs is too slow. A sound technician must be on duty during the entire program, ready to jump at the first sign of feedback. Once feedback occurs, the technician must determine which slider controls the feedback

frequency and how much attenuation is necessary. This process takes too much time and is prone to error.

There is a common misconception that 1/3 octave EQ filters are only 1/3 of an octave wide. Actually, most are about one full octave wide. However, they are placed on 1/3 octave center points, hence their name. The **FBX-1802** has the flexibility to place the center point of its feedback filters within one Hertz of the actual feedback



frequency so the filters only need to be 1/10 octave wide. In fact, all nine **FBX** filters cause much less sound field distortion than two 1/3 octave EQ filters.

WHO NEEDS THE FBX?

Virtually every sound system will be improved with the **FBX**. Small bands that do not have sound technicians can now increase their monitor volumes so that they can hear themselves clearly and with full fidelity, without worrying if the program is going to be ruined by feedback.

Auditoriums and churches of all sizes will enjoy reliable feedback control. Hotels and conference centers can offer meeting rooms with sound systems that won't howl during programs.

Professionals mixing sound for large bands are often simultaneously responsible for a number of performers - each of whom has separate monitor mixes. If feedback occurs, it is very difficult to tell which of the many monitor mixes is resonating. If **FBXs** are substituted for graphic EQs for feedback control, the feedback will automatically be eliminated without any effort from the sound technician.

WHY THE FBX?

The simple beauty of the **FBX** is its ability to quickly and effectively eliminate feedback with narrower filters than ever before possible. The **FBX** delivers superior sound quality automatically.

SPECIAL FEATURES OF THE FBX-1802

- The **FBX-1802** is a dual channel unit.
- It has an improved algorithm that allows it to better distinguish the difference between feedback and music, greatly reducing the chance for error.
- The **FBX-1802** has improved shielding that prevents interference with broad band wireless microphone systems.
- It's designed even more efficiently than previous models. There are fewer parts, yet it has improved feedback control and tonal clarity. That translates to greater effectiveness and reliability.
- A new LOCK FIXED button freezes the Fixed filters created during set-up. The filters still eliminate feedback, but they will not get any deeper than the original setting.
- The user can set the total number of filters desired for each application using the new SET TOTAL NO. button.
- The **FBX-1802** offers a choice between standard 1/10 octave filters or 1/5 octave filters. The narrower 1/10 octave filters are most useful for music applications, such as concerts. The wider 1/5 octave filters are recommended for spoken word applications, such as lecture halls, PA systems or teleconferencing.

INSTRUCTIONS FOR OPERATION

HOW TO USE THE FBX FEEDBACK EXTERMINATOR AUTOMATIC FEEDBACK CONTROLLER:

The **FBX** automatic feedback controller will improve any sound reinforcement system even if it is used incorrectly. By following these simple suggestions, you will be assured of the most benefit from your **FBX** and sound system. The instructions presume that you are familiar with the fundamentals of sound reinforcement. If any of the terms are not clear, or if the system does not perform as expected, contact your Sabine dealer for further information.

WHERE TO PLACE THE FBX IN YOUR SOUND SYSTEM:

Place the **FBX** anywhere in the sound system that a graphic equalizer might be used to control feedback. The most common place is between the output of the mixer and the input of a power amp. In this position, the **FBX** can sense and eliminate feedback occurring in any channel of the mixer. The **FBX** can also be used on a mixer insert.

GRAPHIC EQUALIZERS:

The **FBX** is designed to replace the graphic equalizer's function for eliminating feedback. In many applications, such as churches, auditoriums or small acoustic ensembles, the mixing board provides all the tonal control that is necessary. The **FBX** can replace the graphic EQ in some applications.

If an equalizer is desired, place the **FBX** after the EQ in the signal path. Use the EQ's controls to shape the tonal response of the sound system but **DO NOT NOTCH FOR FEEDBACK**.

FIXED Vs. DYNAMIC FILTERS:

The **FBX** has two types of filters: **FIXED** and **DYNAMIC**. **FIXED FILTERS** retain their frequency center-points until the unit is reset by the user. The system's gain before feedback is limited by the number of **FIXED FILTERS**; i.e., increasing the number of **FIXED FILTERS** increases the system's gain before feedback. The **FBX's DYNAMIC FILTERS** control intermittent feedback that comes and goes throughout the program. They are continually reset automatically to different frequencies as new feedback occurs during the program. **For most applications, the optimal setting is six FIXED and three DYNAMIC FILTERS per channel.**

SYSTEM INITIALIZING PROCEDURE:

Follow these steps to obtain the maximum gain before feedback without changing the tonal quality of your program. (**Important note: Set up only one channel at a time. Do not attempt to ring out both channels of your sound system for feedback simultaneously.**)

1. Place the speakers and microphones in the positions where they will be used during the program. Avoid placing microphones directly in front of speakers.
2. Place the **FBX** (both channels) in **BYPASS MODE**.
3. Set the master volumes to their lowest positions. Turn on the mixer, then the **FBX**, then any other accessories and finally the power amp.
4. If you are using a graphic EQ, adjust only for the desired tonal qualities, but **DO NOT NOTCH FOR FEEDBACK**.
5. Adjust the balance for each mixer channel.
6. Set the sound system's master volume to minimum.
7. Turn the **FBX CLIP LEVEL ADJUST** clockwise to the two o'clock position.
8. Press **RESET** for 4 seconds to clear out filters set previously.
9. You may set the total number of filters you wish to activate (factory default is 9 filters per channel) by holding down the **SET TOTAL NO.** button for 4 seconds. The LEDs will blink 4 times and then go out. Release the **SET TOTAL NO.** button. The LEDs will begin to light in sequence. When the LED corresponding to the desired number of filters lights, press the **SET TOTAL NO.** button. Your selection is complete.

10. Now set the number of Fixed filters you need (factory default is 6 Fixed and 3 Dynamic per channel). Depress the **SET FIXED** button for 4 seconds. The total number of enabled filters set in step 9 will blink 4 times and go out. Release the **SET FIXED** button, and the LEDs will begin to light in sequence. When the LED corresponding to the desired number of Fixed filters lights, press the **SET FIXED** button. Your selection is complete.
11. Put the **FBX** in **ACTIVE** mode for the channel you wish to set.
12. **Slowly** raise the sound system's master volume for the channel being set until feedback occurs. The **FBX** should quickly remove the feedback. The first **FILTER LED** will then blink to indicate a filter has been set.
13. Repeat the procedure described in line 12 until all of the **FIXED FILTERS** and one of the **DYNAMIC FILTERS** are set.
14. Channels A and B must be set individually and separately. To set the remaining channel, repeat this **SYSTEM INITIALIZING PROCEDURE**.
15. Now lower the master volume slightly so that the system is not on the verge of another feedback point. This is the maximum volume level that the **FBX** will be able to provide. Higher levels will cause uncontrollable feedback.
16. Finally, during sound check, adjust the **CLIP LEVEL ADJUST** so that the red **CLIP LED** blinks intermittently, as you would adjust the recording level of a tape recorder. The unit will clip and distort the program if the **CLIP LEVEL ADJUST** is set too high. If it is set too low, the signal-to-noise ratio will degrade and the system may hiss. The best adjustment occurs when the clip levels of the **FBX** and the final power amplifier are matched. This occurs when the clip level indicators on the **FBX** and the final amplifier blink at the same time. Don't be surprised if the **CLIP LEVEL ADJUST** appears low after adjustment during sound check. In some cases, the proper **CLIP LEVEL ADJUST** setting will be as low as the nine o'clock position. This is normal and will not affect the performance of the **FBX** or your sound system.

•**Please note:** If you are using a mixer with unbalanced 1/4" outputs, you must use standard unbalanced cables and connectors when connecting it to the **FBX**. Similarly, if your mixer is wired for balanced 1/4" (Ring/Tip/Sleeve) outputs, you must use that type of connector. If you do not follow this procedure, you may experience a loss of gain when using the **FBX**.

The **FBX** is designed for balanced output. If either side of the balanced output is grounded at any point, clipping or a 6 dB loss in dynamic range may occur at high signal levels (+23 dB peaks or higher).

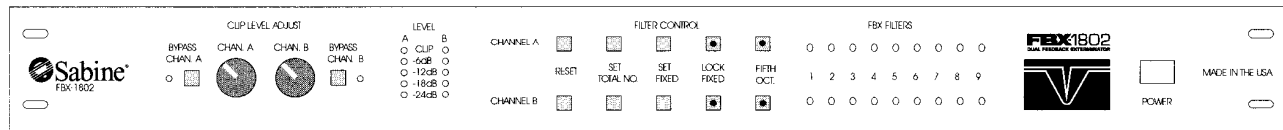
HOW TO USE THE NEW "LOCK FIXED" FEATURE:

In certain situations the **FBX** may mistake music for feedback and drive the Fixed filters deeper than necessary. Typical examples might be in a church with a pipe organ or during a performance with a great deal of intentional sustained electric guitar feedback. You may prevent the Fixed filters from deepening beyond their preset depth by pressing the "**LOCK FIXED**" button on the front panel. The "**LOCK FIXED**" LED will light to indicate that the **FBX** is in "**LOCK FIXED**" mode. The Fixed filters will stay locked until you press the "**LOCK FIXED**" button again. The Dynamic filters are not affected.

SELECTING 1/5 OCTAVE FILTERS:

If the **FBX** is to be used for a music application, the standard 1/10 octave filter is most effective. However, in spoken word applications, such as lectures or teleconferencing, the wider 1/5 octave filter is recommended. You may enable the 1/5 octave filters by pressing the "**FIFTH OCTAVE**" button, and the built-in LED will light. Only filters set after pressing the button in will be 1/5 octave. Press the button again to set subsequent filters to standard 1/10 octave filters.

FRONT PANEL



ACTIVE/BYPASS

Bypass mode takes the unit out of the signal path so that it will have no effect on the program. In Active mode, the unit controls feedback automatically. LEDs indicate whether the unit is in Active or Bypass mode.

CLIP LEVEL ADJUST

Adjust the CLIP LEVEL so that the CLIP LED blinks intermittently. Higher levels will cause distortion and lower levels will cause an increase in sound system noise level. The **FBX** combines the input and output levels into one control so that there is no net gain or loss of signal through the unit regardless of where the CLIP LEVEL is set.

RESET

Press for 4 seconds to reset all filters.

SET TOTAL NO.

To set the total number of filters, depress for 4 seconds and then release the button. The LEDs will begin to light in sequence. When the LED corresponding to the desired number of filters lights, press the button to register your selection.

SET FIXED

To set Fixed filters, hold down for 4 seconds and then release the button. The LEDs will begin to light in sequence. When the LED corresponding to the desired number of Fixed filters, press the button to register your selection.

FIFTH OCTAVE

Press the button at any time to select wider filters for any new filters to be set. It is possible to have both 1/5 and 1/10 octave filters active in one channel simultaneously.

LOCK FIXED FILTERS

When the "LOCK FIXED" button is pressed, its LED will light to indicate that the **FBX** is in "LOCK FIXED" mode. "LOCK FIXED" mode can be activated at any time after system set-up and will stay on until the button is pressed again and the LED turns off.

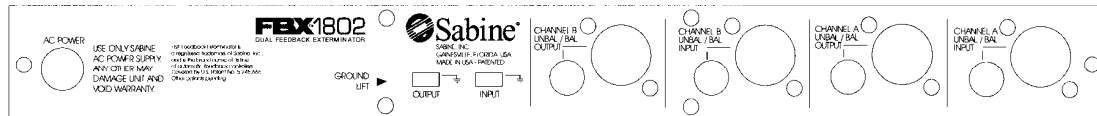
POWERSWITCH

The ON/OFF switch is a two-position rocker-type switch. The LEDs corresponding to all active filters will blink.

FILTER STAGE ACTIVITY

When one of the unit's filters is activated, the corresponding LED lights. A blinking LED indicates the filter that was most recently activated.

BACK PANEL



A/C ADAPTOR

The **FBX** external power supply is included with the unit. Use of any other power supply may cause permanent damage to the unit and **WILL VOID THE WARRANTY**.

THE INPUTS AND OUTPUTS

1/4" TRS and XLR balanced and unbalanced.

MEMORY:

The **FBX** stores the positions and depths of the filters in nonvolatile internal memory when the unit is turned off or during a power failure. The unit will return all filters to their previous frequencies and depths when it is turned back on.

BYPASS MODE:

The **FBX** has a true power-off bypass. The signal is unaffected in BYPASS MODE even if the unit is turned off. Please note that if a combination of BALANCED and UNBALANCED inputs and outputs is used, the signal may be disconnected in BYPASS MODE.

RESETTING THE FILTERS:

The user must reset the **FBX** if the microphones or speakers are

moved significantly. To reset the unit, place the PA system's master volume to minimum and then press the reset button for four seconds until the FILTER LEDs stop flashing. Then follow the system initialization procedure explained previously.

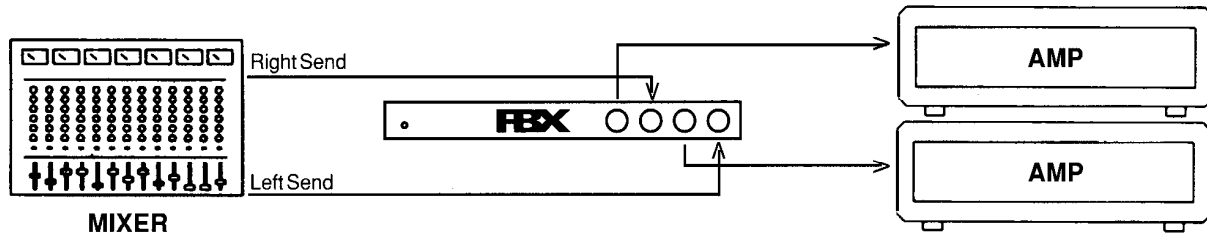
POWER DOWN:

Place the unit in BYPASS MODE before turning the unit off.

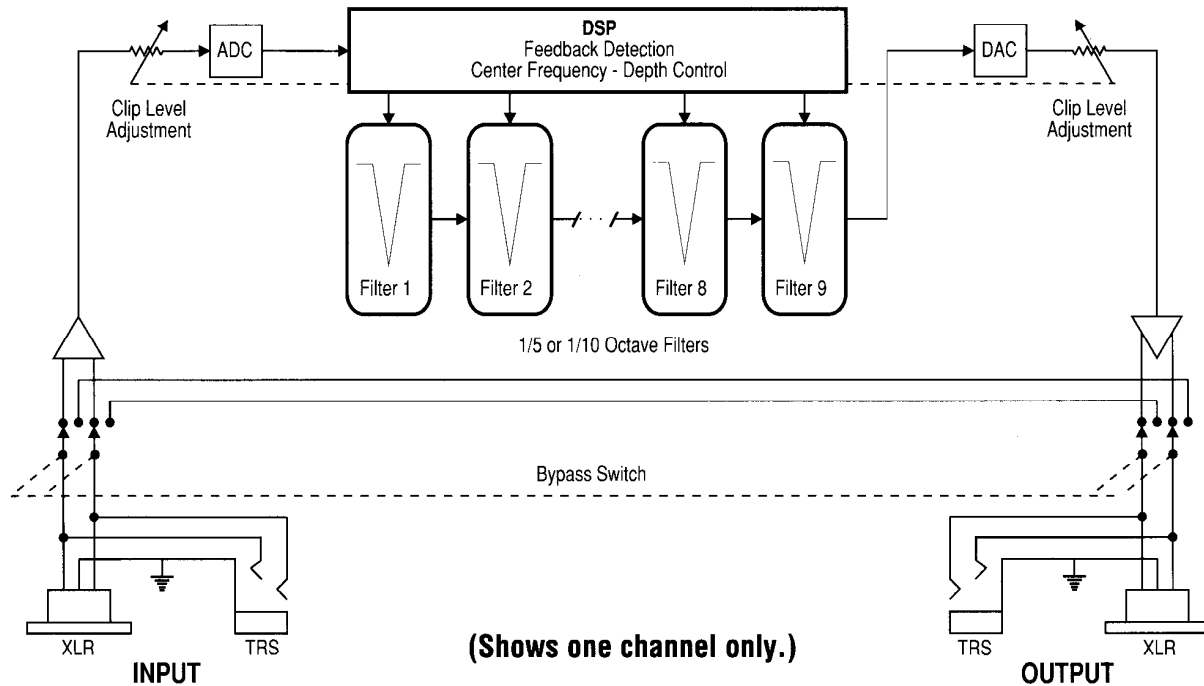
OPTIONAL TRANSFORMERS:

Optional transformers audio isolation transformers are available. The model **FBX-1802** is available with Jensen balanced line transformers that will provide up to 24dBV. (Higher levels can be accommodated on special request. Contact Sabine for more information.)

Typical FBX Set-Up (Mains)



SIMPLIFIED BLOCK DIAGRAM



ANSWERS TO THE MOST FREQUENTLY ASKED QUESTIONS:

Q. Can I place the **FBX** in the mixer's EQ loop?

A. Yes.

Q. Can I place the unit in the mixer effects loop?

A. Avoid this configuration if possible. You can configure the system this way only if each effects send of each mixer channel is set so that all of the signal is routed completely through the effects loop. You cannot mix dry signal with effects signal and still control feedback.

Q. The LEDs on the CLIP LEVEL ADJUST do not light. The unit will not catch feedback. Why?

A. The unit is not in the signal path. Check the connections. Be sure that the program is interrupted when the input is disconnected from the back of the unit.

Q. Can I mix Balanced and Unbalanced inputs and outputs?

A. Yes. Unbalanced input and balanced output is compatible. Balanced input and unbalanced output may result in a 6 dB loss of dynamic range and Bypass may not function correctly.

Q. Why does one of the FILTER ACTIVITY LEDs blink?

A. The last filter to be automatically updated blinks. During normal operation, the blinking will move from filter to filter as they are reset. This gives the user a visual confirmation that the unit is responding to new feedback and is functioning properly.

Q. Sometimes during the initial set-up, the first filter LED will blink before any feedback has been introduced into the system. Why?

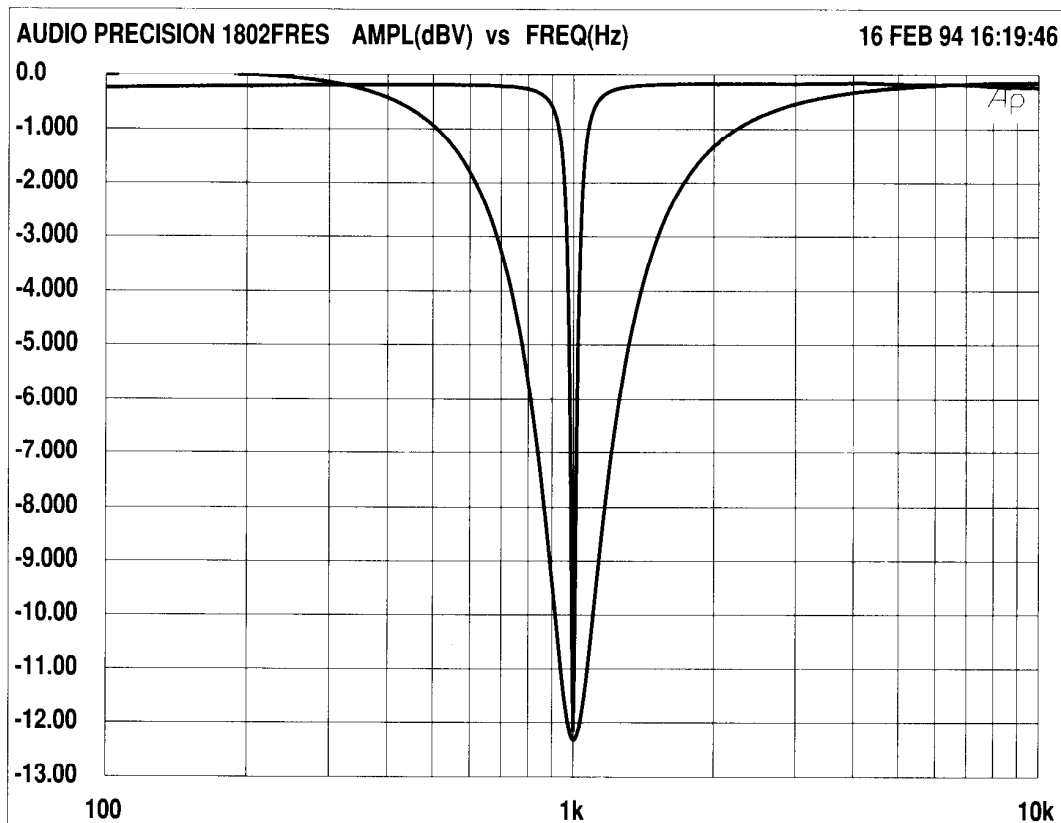
A. The **FBX** will set a filter if the system has a hum. Check for bad grounds. Turn the CLIP LEVEL all the way clockwise, reset the filters, and try again.

Q. Why does the **FBX** cause a noticeable hum?

A. It hums if the main power voltage drops significantly below 10% of the specified voltage. Check the A/C power mains.

Q. Why does my system sound thin and muffled?

A. Place the **FBX** in BYPASS MODE. If the system still sounds thin, your problem is probably with improper use of a graphic EQ. If the problem is really the **FBX**, reinitialize the system. Also, be sure that the unit's CLIP LEVEL is properly adjusted.



FREQUENCY RESPONSE:
FBX-1802 1/10 Octave
Filter Vs. 1/3 Octave
Graphic Equalizer Filter
(12 dB depth; Log Scale).

Test performed using an Audio Precision System One model 322.

ENGINEERING SPECIFICATIONS

FILTERS

Nine independent digital notch filters per channel which can be controlled automatically from 20 Hz to 20 KHz.

Filter width: user-controllable — either 1/10 or 1/5 octave

Resolution: 1 Hz from 20 Hz to 20 KHz

Time required to find and eliminate feedback: 0.4 seconds, typical @ 1KHz

Total number of combined filters active per channel: user selectable, from 1 to 9

Number of Dynamic vs. Fixed filters per channel: user selectable

NOISE GATE

Dwell time: 500 mSec

Threshold: -60 dB instant off

LAST CONFIGURATION STORED IN MEMORY

INPUT/OUTPUT*

Input Impedance: Balanced or unbalanced >10K Ohms, PIN 2 high

Output Impedance: Balanced or unbalanced 10 Ohms nominal, PIN 2 high

Input/Output Maximum Signal Levels: Balanced +29dBV peak, unbalanced +23 dBV peak

Bypass: manual switch

Headroom:

+25dB peak @ 4dBV nominal input

I/O Connectors: XLR-3 and 1/4" TRS

PERFORMANCE**

Spectral Variation: < .25 dB, 20Hz to 20 KHz

SNR: >100 dB; typically 110 dB (with Noise Gate set at -60 dB with 0.5 sec hold time)

THD: <0.02% @ 23 dBV sine wave at 1 KHz

Dynamic Range: >100 dB

POWER SUPPLY

Dual 20 VAC, 50/60 Hz available in 100 V, 120 V, 220 V, or 240 V; 22 Watts max

MEMORY BATTERY LIFE

10 years

DIMENSIONS

1-U rack mount; 19 x 1.75 x 7.5 ins. nominal (rack mountable); 48.3 x 4.5 x 16.5 cms. nominal (rack mountable)

WEIGHT

5.80 lbs (2.5 kg) nominal

OPTIONS

Input transformer option

Output transformer option

*(Note: Inputs may be balanced or unbalanced. For maximum output capability, outputs must be balanced (XLR or TRS). If either side of an output is grounded, the peak output and dynamic range will be reduced by 6 dB. If a grounded output cannot be avoided, use a balanced to unbalanced line transformer or the output transformer option.)

** Tests performed using an Audio Precision System One model 322 or equal.

(SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE)

Section Twelve: Cautions & Warranty

Warning! This equipment must be earthed.

Caution! Risk of electric shock. Do not open.

Caution! Shock hazard. Do not remove covers. No user serviceable parts inside. Refer servicing to qualified service personnel.

Warning! To reduce the risk of fire or electric shock, do not expose this product to rain or moisture.

Attention! Cet appareil doit être relié à la terre.

Attention! Risque de choc électrique; ne pas ouvrir.

Attention! Risque de choc; ne pas ôter les capots. Aucune pièce accessible à l'intérieur. S'adresser à un technicien qualifié.

Attention! Pour réduire le risque d'incendie ou de choc électrique, ne pas laisser l'appareil sous la pluie ou à l'humidité.

Achtung! Dieses Gerät muss Schutzgeerdet sein.

Achtung! Gefahr eines elektrischen Stromschlags. Gehäuse nicht öffnen.

Achtung! Gefahr eines elektrischen Stromschlags. Gehäuse nicht öffnen. Keine von Benutzer zu bedienenden Teile im Geräteinneren.

Überlassen Sie das Gerät zu Servicezwecken nur geschultem Fachpersonal.

Um Brandgefahr oder das Risiko eines elektrischen Schlags auszuschließen, das Gerät vor Nässe und Feuchtigkeit schützen.

Advertencia! Este equipo debe estar conectado a tierra.

Precaución! Riesgo de descarga eléctrica. No abrir.

Precaución! Riesgo de descarga eléctrica. No desmontar las tapas. Piezas interiores no reparables por el usuario. Reparable sólo por personal cualificado.

Advertencia! Para reducir el riesgo de incendio o de descarga eléctrica no exponga este producto a la lluvia o humedad.

FCC Statement:

This device complies with Part 15, Class B, of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference; and (2) This device must accept any interference received, including interference that may cause undesired operation. *Warning:* Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Canadian Compliance Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Japanese EMI Compliance Statement

この装置は、第二種情報装置

(住宅地域又はその隣接した地域において使用されるべき情報装置)で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会 (VCCI) 基準に適合しております。

しかし、本装置をラジオ、テレビジョン受信機に近接してご使用になると、受信障害の原因となることがあります。

取扱説明書に従って正しい取り扱いをして下さい。



Warning!



The Graphi-Q is designed to operate from standard AC power. Please be sure the power in your area is compatible with the power requirements marked on the rear of the unit. Using the wrong input voltage may cause permanent damage to the unit and will void the warranty.

The Graphi-Q is supplied with one of the following AC power cords:

Japan	100 VAC
U.S./North America	120 VAC
Continental Europe	230 VAC
United Kingdom	240 VAC
Australia	240 VAC



Caution!



Replace the fuse with a fuse of exactly the same rating specified on the rear of the product.

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be retained for future reference.
3. Obey all cautions in the operating instructions and on the unit.
4. All operating instructions should be followed.
5. Use only shielded audio and data cables.
6. This product should not be used in the presence of moisture or rain, or near any water, i.e., a bathtub, sink, swimming pool, wet basement, etc.
7. This product should be located so that its position does not interfere with proper ventilation. Do not use in direct sunlight. Do not place flat against a wall or in a built-in enclosure that will impede the flow of cooling air.
8. This product should not be placed near a source of heat such as a stove or radiator.
9. Connect only to a power supply of the type marked on the unit adjacent to the power entry module.
10. Never break off the ground pin on the power supply cord.
11. Power supply cords should always be handled carefully. Never walk or place equipment on power supply cords. Periodically check cords for cuts or signs of stress, especially at the plug and the point where the cord exits the unit.
12. The power supply cord should be unplugged when the unit is to be unused for long periods of time.
13. Care should be taken so that objects do not fall and liquids are not spilled into the unit through the ventilation holes or any other openings.
14. This unit should be checked by a qualified service technician if:
 - A. The power supply cord or plug has been damaged.
 - B. Anything has fallen or been spilled into the unit.
 - C. The unit does not operate correctly.
 - D. The unit has been dropped or the enclosure damaged.
15. The user should not attempt to service this equipment. All service work should be done by a qualified service technician.

OSHA 2201; 1995 revised.

CAUTION

EXPOSURE TO EXTREMELY HIGH NOISE LEVELS MAY CAUSE A PERMANENT HEARING LOSS. INDIVIDUALS VARY CONSIDERABLY IN SUSCEPTIBILITY TO NOISE INDUCED HEARING LOSS, BUT NEARLY EVERYONE WILL LOSE SOME HEARING IF EXPOSED TO SUFFICIENTLY INTENSE NOISE FOR A SUFFICIENT TIME. THE U.S. GOVERNMENT'S OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAS SPECIFIED THE FOLLOWING PERMISSIBLE NOISE LEVEL EXPOSURES:

DURATION/DAY IN HOURS	SOUND LEVEL IN dBA, SLOW RESPONSE
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
1/4 or less	115

ACCORDING TO OSHA, ANY EXPOSURE IN EXCESS OF THE ABOVE PERMISSIBLE LIMITS COULD RESULT IN HEARING LOSS. EAR PLUGS OR PROTECTORS IN THE EAR CANALS OR OVER THE EARS MUST BE WORN WHEN OPERATING THIS DEVICE IN ORDER TO PREVENT A PERMANENT HEARING LOSS, IF EXPOSURE IS IN EXCESS OF THE LIMITS AS SET FORTH ABOVE. TO ENSURE AGAINST POTENTIALLY DANGEROUS EXPOSURE TO HIGH SOUND PRESSURE LEVELS, IT IS RECOMMENDED THAT ALL PERSONS EXPOSED TO EQUIPMENT CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS SUCH AS THIS DEVICE BE PROTECTED BY HEARING PROTECTORS WHILE THIS UNIT IS IN OPERATION.

CAUTION

This apparatus contains a lithium battery. Replacement shall be made by qualified service personnel only.
Call Sabine at (386) 418-2000 or consult an authorized Sabine agent.

FBX and FBX Feedback Exterminator are registered trademarks of Sabine, Inc., and are the brand names of its line of automatic feedback controllers. Covered by U.S. Patent No. 5,245,665, Australian Patent No. 653,736, Canadian Patent No. 2,066,624-2, German Patent No. 69118486.0, and U.K. Patent No. 0486679. Other patents pending.

REAL-Q and REAL-Q2 are protected by U.S. Patent No. 5,506,910. Other patents pending.

Graphi-Q, POWER-Q, REAL-Q, and REAL-Q2 are trademarks of Sabine, Inc.
Copyright 2001. All rights reserved.

Limited Warranty

THIS LIMITED WARRANTY VALID ONLY WHEN PURCHASED AND REGISTERED IN THE UNITED STATES OR CANADA. ALL EXPORTED PRODUCTS ARE SUBJECT TO WARRANTY AND SERVICES TO BE SPECIFIED AND PROVIDED BY THE AUTHORIZED DISTRIBUTOR FOR EACH COUNTRY.

Ces clauses de garantie ne sont valables qu'aux Etats-Unis et au Canada. Dans tous les autres pays, les clauses de garantie et de maintenance sont fixées par le distributeur national et assurées par lui selon la législation en vigueur.

Diese Garantie ist nur in den USA und Kanada gültig. Alle Export-Produkte sind der Garantie und dem Service des Importeurs des jeweiligen Landes unterworfen.

Esta garantía es válida solamente cuando el producto es comprado en E.U. continentales o en Canada. Todos los productos que sean comprados en el extranjero, están sujetos a las garantías y servicio que cada distribuidor autorizado determine y otorgue en los diferentes países.

ONE-YEAR LIMITED WARRANTY/REMEDY

SABINE, INC. ("SABINE") warrants this product to be free from defects in material and workmanship for a period of one (1) year from date of purchase PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and is subject to the conditions, exclusions and limitations hereinafter set forth:

CONDITIONS, EXCLUSIONS AND LIMITATIONS OF LIMITED WARRANTIES

These limited warranties shall be void and of no effect if:

- The first purchase of the product is for the purpose of resale; or
- The original retail purchase is not made from an AUTHORIZED SABINE DEALER; or
- The product has been damaged by accident or unreasonable use, neglect, improper service or maintenance, or other causes not arising out of defects in material or workmanship; or
- The serial number affixed to the product is altered, defaced or removed; or
- The power supply grounding pin is removed or otherwise defeated. In the event of a defect in material and/or workmanship covered by this limited warranty, Sabine will repair the defect in material or workmanship or replace the product, at Sabine's option; and provided, however, that, in any case, all costs of shipping, if necessary, are paid by you, the purchaser.

THE WARRANTY REGISTRATION CARD SHOULD BE ACCURATELY COMPLETED, MAILED TO AND RECEIVED BY SABINE WITHIN FOURTEEN (14) DAYS FROM THE DATE OF YOUR PURCHASE.

In order to obtain service under these warranties, you must:

- Bring the defective item to any Authorized SABINE DEALER and present therewith the ORIGINAL PROOF OF PURCHASE supplied to you by the AUTHORIZED SABINE DEALER in connection with your purchase from him of this product. If the DEALER is unable to provide the necessary warranty service, you will be directed to the nearest other SABINE AUTHORIZED DEALER which can provide such service.

OR

- Ship the defective item, prepaid, to:

SABINE, INC.
13301 HIGHWAY 441
ALACHUA, FL 32615-8544

including therewith a complete, detailed description of the problem, together with a legible copy of the original PROOF OF PURCHASE and a complete return address. Upon Sabine's receipt of these items:

If the defect is remedied under the limited warranties and the other terms and conditions expressed have been complied with, Sabine will provide the necessary warranty service to repair or replace the product and will return it, FREIGHT COLLECT, to you, the purchaser. Sabine's liability to the purchaser for damages from any cause whatsoever and regardless of the form of action, including negligence, is limited to the actual damages up to the greater of \$500.00 or an amount equal to the purchase price of the product that caused the damage or that is the subject of or is directly related to the cause of action. Such purchase price will be that in effect for the specific product when the cause of action arose. This limitation of liability will not

apply to claims for personal injury or damage to real property or tangible personal property allegedly caused by Sabine's negligence. Sabine does not assume liability for personal injury or property damage arising out of or caused by a non-Sabine alteration or attachment, nor does Sabine assume any responsibility for damage to interconnected non-Sabine equipment that may result from the normal functioning and maintenance of the Sabine equipment.

UNDER NO CIRCUMSTANCES WILL SABINE BE LIABLE FOR ANY LOST PROFITS, LOST SAVINGS, ANY INCIDENTAL DAMAGES OR ANY CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT, EVEN IF SABINE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

THESE LIMITED WARRANTIES ARE IN LIEU OF ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE; PROVIDED, HOWEVER, THAT IF THE OTHER TERMS AND CONDITIONS NECESSARY TO THE EXISTENCE OF THE EXPRESS LIMITED WARRANTIES, AS HEREINABOVE STATED, HAVE BEEN COMPLIED WITH, IMPLIED WARRANTIES ARE NOT DISCLAIMED DURING THE APPLICABLE ONE-YEAR PERIOD FROM DATE OF PURCHASE OF THIS PRODUCT.

SOME STATES DO NOT ALLOW LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS, OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. THESE LIMITED WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

THESE LIMITED WARRANTIES ARE THE ONLY EXPRESS WARRANTIES ON THIS PRODUCT, AND NO OTHER STATEMENT, REPRESENTATION, WARRANTY OR AGREEMENT BY ANY PERSON SHALL BE VALID OR BINDING UPON SABINE.

In the event of any modification or disclaimer of express or implied warranties, or any limitation of remedies, contained herein conflicts with applicable law, then such modification, disclaimer or limitation, as the case may be, shall be deemed to be modified to the extent necessary to comply with such law.

Your remedies for breach of these warranties are limited to those remedies provided herein, and Sabine gives this limited warranty only with respect to equipment purchased in the United States of America.

INSTRUCTIONS-WARRANTY REGISTRATION CARD

1. Mail the completed WARRANTY REGISTRATION CARD to:

SABINE, INC.
13301 HIGHWAY 441
ALACHUA, FL 32615-8544

- a. Keep the PROOF OF PURCHASE. In the event warranty service is required during the warranty period, you will need this document. There will be no identification card issued by Sabine, Inc.

2. IMPORTANCE OF WARRANTY REGISTRATION CARDS AND NOTIFICATION OF CHANGES OF ADDRESS:

- a. Completion and mailing of WARRANTY REGISTRATION CARDS - Should notification become necessary for any condition that may require correction, the REGISTRATION CARD will help ensure that you are contacted and properly notified.
 - b. Notice of address changes - If you move from the address shown on the WARRANTY REGISTRATION CARD, you should notify Sabine of the change of address so as to facilitate your receipt of any bulletins or other forms of notification which may become necessary in connection with any condition that may require dissemination of information or correction.
3. You may contact Sabine directly by telephoning (386) 418-2000.
 4. Please have the Sabine product name and serial number available when communicating with Sabine Customer Service.

MADE IN USA

Manufactured by: Sabine, Inc.

13301 Highway 441

Alachua, Florida 32615-8544 USA

Phone: (386) 418-2000 • Fax: (386) 418-2001

www.Sabine.com

SABINE[®]
ADAPTIVE AUDIO

FBXTM1802

DUAL FEEDBACK EXTERMINATOR

ADDENDUM TO THE OPERATING GUIDE

Your Sabine FBX is the state-of-the-art in automatic feedback elimination. For best results, it is important to follow the INSTRUCTIONS FOR OPERATION. Please also take time to read this valuable new information.

1. Please note the following change in operation of the FBX-1802:

The FBX-1802 now incorporates multicolored BYPASS LEDs that light red when the unit is in BYPASS mode and green when in ACTIVE mode. The unit previously used a red LED that lighted only when the FBX-1802 was in BYPASS mode.

2. User-selectable noise gate:

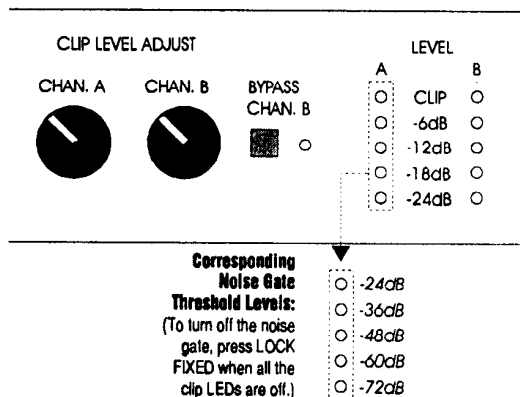
One outstanding feature of your FBX-1802 is a user-selectable noise gate. It acts as an automatic switch that opens a microphone only when someone is speaking directly into the mic. A noise gate is especially useful in systems that have a number of open microphones, such as courtrooms, conference rooms, or distance learning sites. Gating microphones greatly reduces the number of possible feedback points in the room and allows for more system gain.

The level that turns the noise gate on and off is called the threshold. If the level coming into the gate is greater than the threshold, the noise gate opens, and the mic is turned on. If it is less than the threshold, the noise gate closes, and the mic is turned off.

You can adjust your 1802 to five different threshold levels or turn it off. (Factory default is off.) You may only set up one channel at a time. To **enable** the noise gate and select the threshold, power down the 1802. Hold in the LOCK FIXED button for the channel you are setting, and power up the 1802. When you let go of the button, the clip level LEDs will light in sequence. Select the threshold level by pressing the LOCK FIXED button again when the clip LED lights at the corresponding level. (See illustration at right.) To **disable** the noise

gate, press the LOCK FIXED button when no clip LEDs are lighted. Repeat this procedure for the other channel.

When the noise gate is enabled, the clip light corresponding to the selected threshold level flashes on power-up. If no lights flash on power-up, the noise gate is not enabled. The 1802's noise gate will not become active until after you've set all fixed filters and one dynamic filter (if the 1802 is configured for any). The noise gate also becomes active when you press the LOCK FIXED button.



(See other side.)

SABINETM
ADAPTIVE AUDIO

13301 Highway 441
Alachua, FL 32615-8544 USA
Phone: (904)418-2000
Fax: (904)418-2001